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AUTHOR Christiansen, Janet C.; And Others
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ABSTRACT

The third in a series concerning some implications of learners' cognitive style for the development of reading competence, this paper reports on a study that was concerned with the effectiveness and efficiency with which ninth grade field dependent and field independent readers processed prose in silent reading at three difficulty levels. Results reported in the paper suggest that an inspection of the types and frequency of miscues and omissions revealed no differences between low-average and below-average readers within each of the groups. (MKM)

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Janet C. Christiansen
Frederick R. Annesley
Edward Scott

Faculty of Education,
James Cook University
of North Queensland,
Australia, 4811.

Relationship between Cognitive Style and the Acquisition of Meaning in Content Reading

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"But they can't read!" is an oft-heard comment about secondary students. In fact they can read and Herber (1978, p.19) describes "the nook and cranny curriculum" which suggests that what they "can't read" is content material.

Smith (1978, p.79) comments that the knowledge which the reader brings to the reading act - "the theory of the world in the head" - determines the meaning the reader will get from the encoded information. If the reader does not have a sufficient understanding of the subject matter prior to reading then the written message will be "nonsense". He will not comprehend; so he will not expand his "theory". The implication of Smith's proposition is that students need to have prior knowledge of subject-specific vocabulary and concepts if they are to be successful content readers.

Goodman (in Singer and Ruddell, 1976, p.497) describes the reading process as "a psycholinguistic guessing game" in which readers predict, sample and then confirm or refine their predictions about the information contained in the passage. In making predictions, each reader has his own expectations about the printed message based on his "theory". Then to confirm the predictions he makes, he samples the psycholinguistic cues - grapho-phonic, syntactic and semantic. Fluent readers are those whose conceptual knowledge, experiential background and language competence permit them to make informed predictions and to sample cues effectively, efficiently and economically.

The differing effects of affective factors on reading performance has not been investigated in this study. However, it is seen as an important area for future research. Ruddell (in Singer and Ruddell, 1976, p.463) refers to the importance of "affective mobilisers", i.e. the interests, attitudes and values that a person holds. It is felt that this will influence the way the student perceives content reading, and will affect motivation and willingness to keep "guessing". Smith (1978, p.98) suggests that reading provides its own feedback. If this is so then successful reading will be reinforcing in both the affective and cognitive domains. Thus the need to ensure successful, efficient reading is very important.

The relationship of cognitive style to reading achievement is well documented by Scott *et al.*, 1976, 1980; Annesley *et al.*, 1977. Witkin *et.al.* (1977, p.15) describe cognitive style as the ways individuals "perceive, think, solve problems, learn, relate to others, etc." One dimension of cognitive style, field dependence-field independence (FD-FI) describes the extent to which individuals are constrained by the field or the context in which the event occurs. It is suggested that this factor will influence the individual's willingness to take risks in decision-making and that it will also affect the kinds of decisions he will make. Field dependent individuals require structured and well

organised material, which presents information clearly and logically. Field independent individuals are more likely to impose organisation and seem to learn best when free to do this. This difference between FD-FI individuals is not a matter of the extent of their "theory" but is rather a matter of how they are able to access that "theory". Scott *et.al.*, (1980) have referenced it as a difference between "outside-in" and "inside-out" modes of behaving.

It would therefore seem that FD subjects will be less likely to "guess" when the reading material is at an inappropriate difficulty level, where the vocabulary and concepts are not known, and where the style of writing is unfamiliar. F.D. subjects are not high risk-takers. They are not willing to "guess" where there is a likelihood of being wrong. When they do make guesses they are most likely to be acceptable at the grapho-phonic and syntactic levels since both word form and grammar help to provide structure. Maher's 1979 study supports this hypothesis at the grapho-phonic level for oral reading. On the other hand, it is likely that FI subjects, in a reading situation similar to that described above, will "guess" readily and indiscriminately, and many of their responses will be inaccurate because they lack the "theory" to make informed guesses.

Teachers are aware that many school texts are too difficult for some students to read. This paper addresses

itself to the problem of poor readers exposed to reading material which is too difficult, and will propose some ways of dealing with the problem.

For the purpose of this paper reading is described as the interface between the "theory" of the reader and that portion of the writer's "theory" that he has encoded. The outcome will be affected by the cognitive style of the reader (and maybe of the writer, too) and by the constraints imposed by the difficulty level of the passage.

The aim of this pilot study, then, was to see if there were any differences in the way print was processed in oral and silent reading by field dependent (FD) and field independent (FI), low average (LAR) and below average (BAR) adolescent readers at the three difficulty levels of reading. Five questions were considered:

(1) At the three difficulty levels of reading (frustration, instructional and independent) are there differences in the way print is processed in silent and oral reading (a) between each cognitive style and (b) within each cognitive style?

(2) Are there differences in error patterns (omissions and miscues) between LAR and BAR within each cognitive style?

(3) At each difficulty level are there different patterns of reading accuracy (a) between the two cognitive styles, and (b) within the two cognitive styles?

(4) At each difficulty level are there differences in error patterns (a) between the cognitive styles and (b) within the cognitive styles?

(5) At each difficulty level are there differences in miscue patterns (syntactic and semantic acceptability) (a) between the cognitive styles and (b) within the cognitive styles.

This paper will only report on the data for questions (2), (3), (4) and (5) in relation to silent reading. Since most reading in secondary schooling is silent, this aspect of the study has been considered first.

METHOD

It will be recalled that the purpose of this study, initially, was concerned with the effectiveness and efficiency with which FD and FI low average and below average readers process discursive prose in both oral and silent reading at three difficulty levels of reading. It was therefore decided to select a small sample in order to test the conceptual framework described above, before engaging in a larger study.

SUBJECTS

The subjects were 15 ninth-grade students, (i.e. in the second year of secondary school), in a large urban Queensland state high school who had been subjects in the Annesley *et al.* 1978 study. Of these, eight were

field dependent and seven were field independent (an eighth FI student was omitted from the sample because his lack of responses seemed to indicate that he did not understand the cloze procedure). Cognitive style data were obtained from the Group Embedded Figures Test (Witkin, 1971), which was found to be stable when re-tested after eighteen months.

Reading achievement was measured by the Progressive Achievement Tests (ACER, 1973), Form A: Vocabulary and Comprehension. Low average readers (LAR) were defined as those students with stanines of 5 and 4 or 4 and 4 on the subtests. Below average readers (BAR) were those with stanines of 3, 2 or 1 on the subtests.

Annesley *et al.* (1978) established that there were no sex differences on cognitive style as measured by the Group Embedded Figures Test (GEFT) for Townsville eighth graders. Therefore, sex difference was not considered a factor to be controlled in this study. Intelligence scores, as measured by the Otis Intermediate Test: Form AB (ACER, 1958), and chronological age were within the normal limits for ninth graders in Queensland state high schools.

MATERIALS

High interest, discrete passages of discursive prose of approximately 300 words were chosen from the Readers' Digest Reading Skill Builders, and were graded

for difficulty using Fry's Readability Formula (Fry, 1977). Six passages graded from 2 to 7 and judged to be within the experience (either direct or vicarious) of young adolescents were selected as the test material. For each of these six passages conventional cloze *n*th deletions (n = 7) were made, leaving the first and last sentence of each passage intact. This resulted in 30 deletions per passage, and these deletions were replaced by standard length blanks.

The six graded cloze passages were set out in booklet form, one passage per page, and in ascending order of difficulty. An introductory page gave simple instructions and practice examples to be explained by the examiner. Each subject completed the tests in an untimed situation by supplying the word he thought best for each deletion. In an attempt to observe self correction strategies, the students were asked not to erase errors, but to cross them out and write in the new words.

PROCEDURE

For each subject, a passage at each of the three difficulty levels of reading was identified using the following criteria

Difficulty Level	% Accuracy	Number of Errors for Each Level
Frustration	<40	18+
Instructional	40-59	12-17
Independent	60+	<12

The miscues on the fifteen passages at each of the three difficulty levels were then analysed, and coded according to syntactic and semantic acceptability. Omissions and self-corrections were also coded (see Figure 1).

Totals for each coded category for LAR, BAR, FD and FI at each reading difficulty level were then calculated as percentages of total errors.

RESULTS

An inspection of the types and frequency of errors (miscues and omissions) indicated that there were no differences between low average and below average readers within each of the cognitive style groups. Therefore, the two reading groups for each cognitive style were combined since the important variable was type and frequency of error at each level of reading for field dependence and field independence.

It was also noted that there were few self-corrections for either group at each of the difficulty levels. This seems to suggest that any self-correcting

strategy operates before the act of writing.

Figure 1
Categories of errors (miscues and omissions) and self corrections

Text	Miscue	Omission	Self-Correction	Syntactic						Semantic					
				Same grammatic function			Grammatically acceptable sentence			Acceptable Alternative within sentence			Meaning of passage retained		
				Y	P	N	Y	P	N	Y	P	N	Y	P	N
	TOTALS														

ACCURACY OF READING

Accuracy of silent reading was calculated as percentages of accurate responses, of miscues and of omissions for each reading difficulty level for both FD and FI subjects (See Table 1 and Figure II).

Table 1

Pattern of accuracy for three reading levels for FD and FI expressed as percentages

	FD (N=8)			FI (N=7)		
	Frust-rational	Instruc-tional	Inde-pendent	Frust-rational	Instruc-tional	Inde-pendent
Accuracy	27.6	48.7	63.7	36.7	49.5	73.3
Miscue	43.8	44.1	33.3	60.6	48.6	26.2
Omission	28.6	7.1	2.9	2.7	1.9	0.5

Analysis of the pattern of accuracy indicates:

1. Much lower omission rates for FI subjects at all reading levels.
2. The percentage of omissions for both cognitive styles decreases as reading difficulty decreases, although the decrease is greater for the FD subjects.
3. The pattern of accuracy is most similar at the independent level of reading and least similar at the frustration level.

FREQUENCY OF ERROR CATEGORIES

Total errors included omissions and miscues, with each miscue analyzed for syntactic and semantic acceptability. The pattern of errors is recorded as percentages of total errors. See Table 2 and Figures III a, b and c.

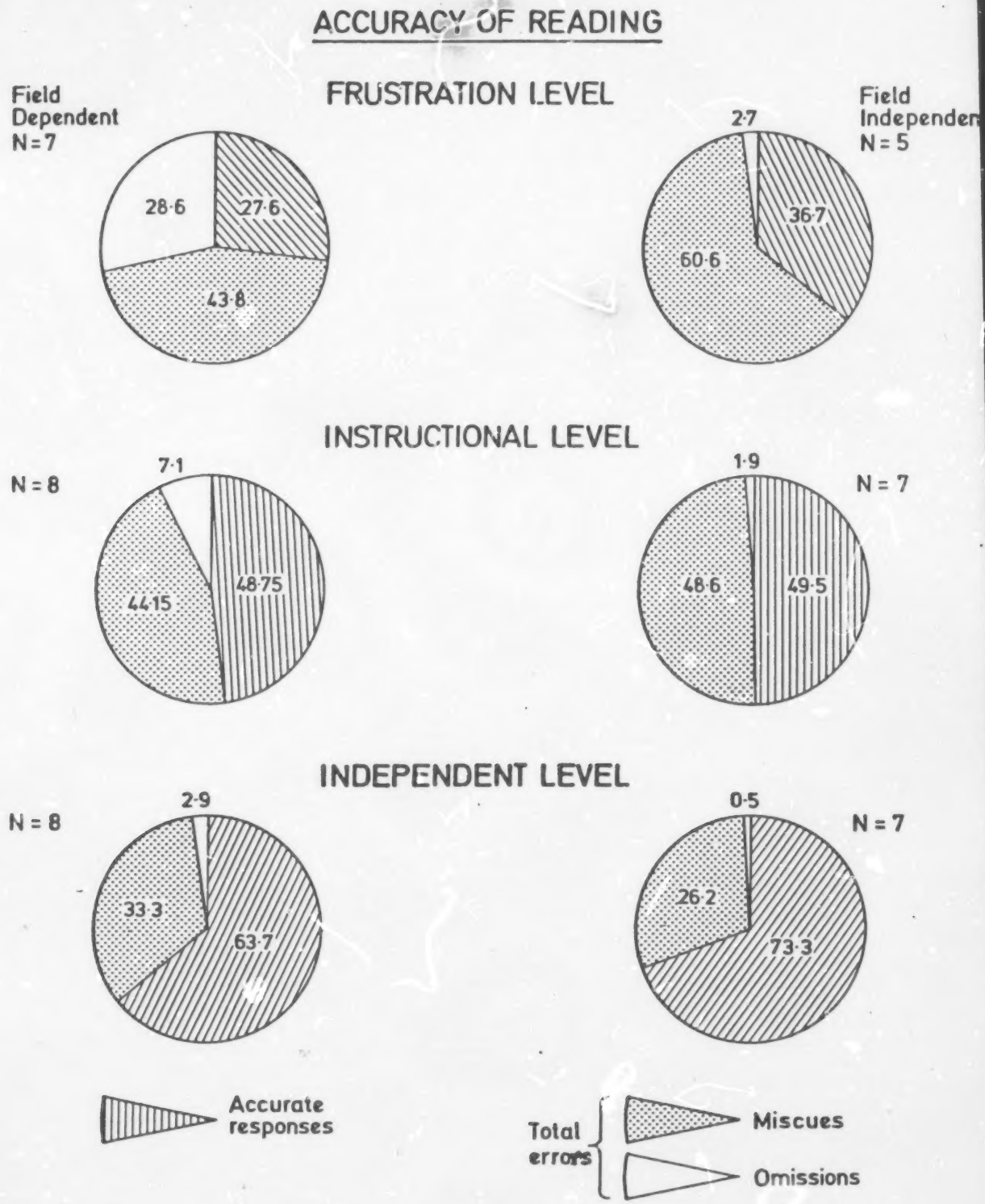
ACCURACY OF READING
FRUSTRATION LEVEL
Field Dependent N=7
28·6
27·6
43·8
Field Independent N=5
2·7
36·7
60·6
INSTRUCTIONAL LEVEL
N=8
7·1
48·75
44·15
N=7
1·9
48·6
49·5
INDEPENDENT LEVEL
N=8
2·9
33·3
63·7
N=7
0·5
26·2
73·3
Accurate responses
Total errors
Miscues
Omissions

Figure II

Table 2

Pattern of errors for three reading levels for FD and FI expressed as percentages

Difficulty Level	Cognitive Style	Omissions	Miscues											
			Syntactic						Semantic					
			Same grammatic function			Grammatically acceptable sentence			Acceptable Alternative Within Sentence			Meaning of Passage Retained		
			Y	P	N	Y	P	N	Y	P	N	Y	P	N
Frustration	FD	39.5	38.2	8.5	13.8	38.2	2.6	19.7	40.1	7.9	12.5	15.1	8.5	36.8
	FI	4.2	65.3	14.7	15.8	72.6	5.3	17.9	69.5	8.4	17.9	26.3	15.8	53.7
Instructional	FD	13.8	56.9	3.2	26.0	62.6	3.2	20.3	60.2	5.7	20.3	17.1	24.4	44.7
	FI	3.8	63.2	3.8	29.2	67.0	7.5	21.7	61.3	11.3	23.6	21.7	24.5	50.0
Independent	FD	8.0	78.2	2.3	11.5	70.1	3.4	18.4	77.0	8.0	6.9	18.4	47.1	26.4
	FI	1.8	83.9	1.8	12.5	82.1	3.6	12.5	82.1	7.1	8.9	17.9	50.0	30.4

ANALYSIS OF ERRORS — FRUSTRATION LEVEL

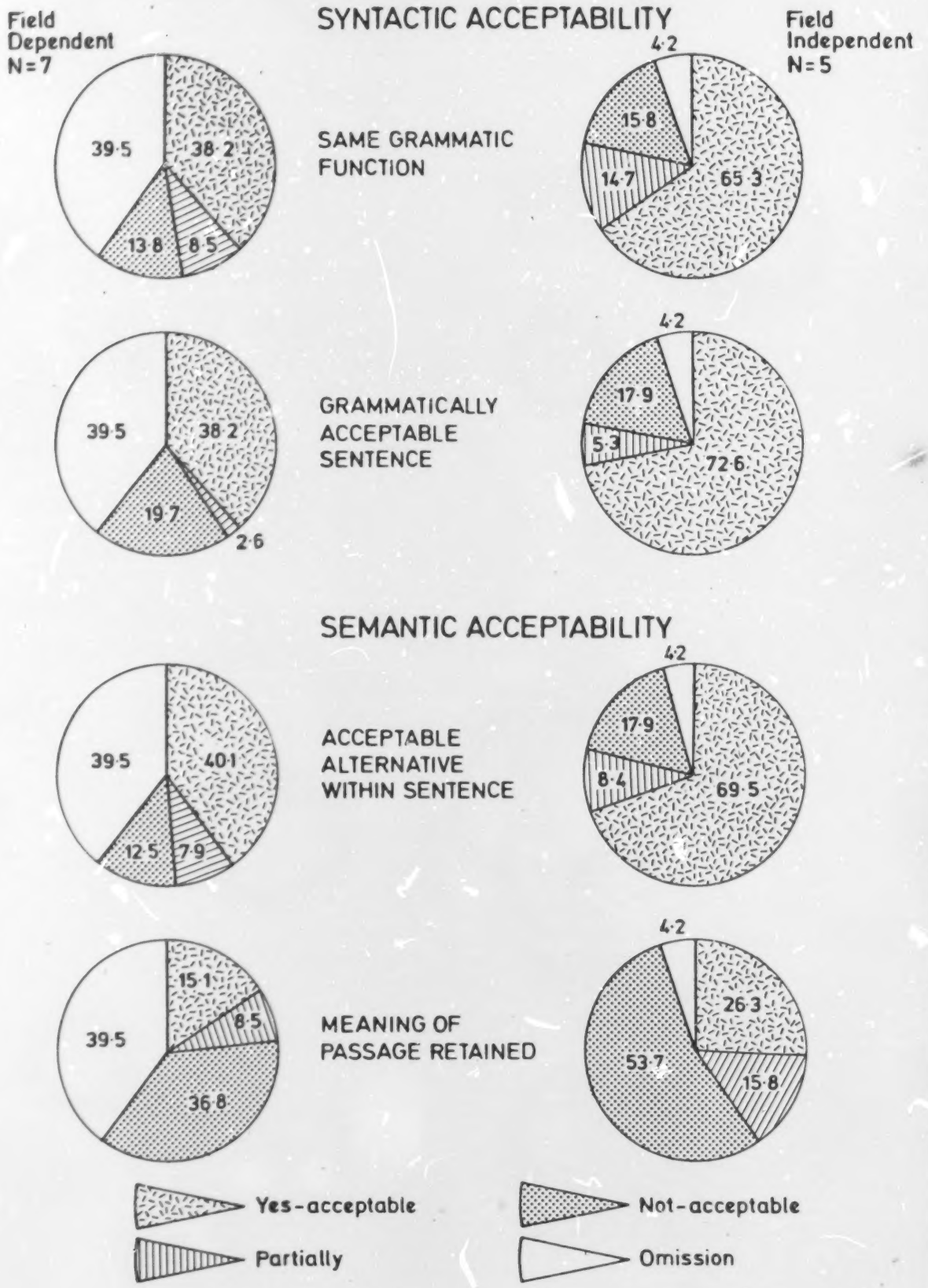

Figure IIIa

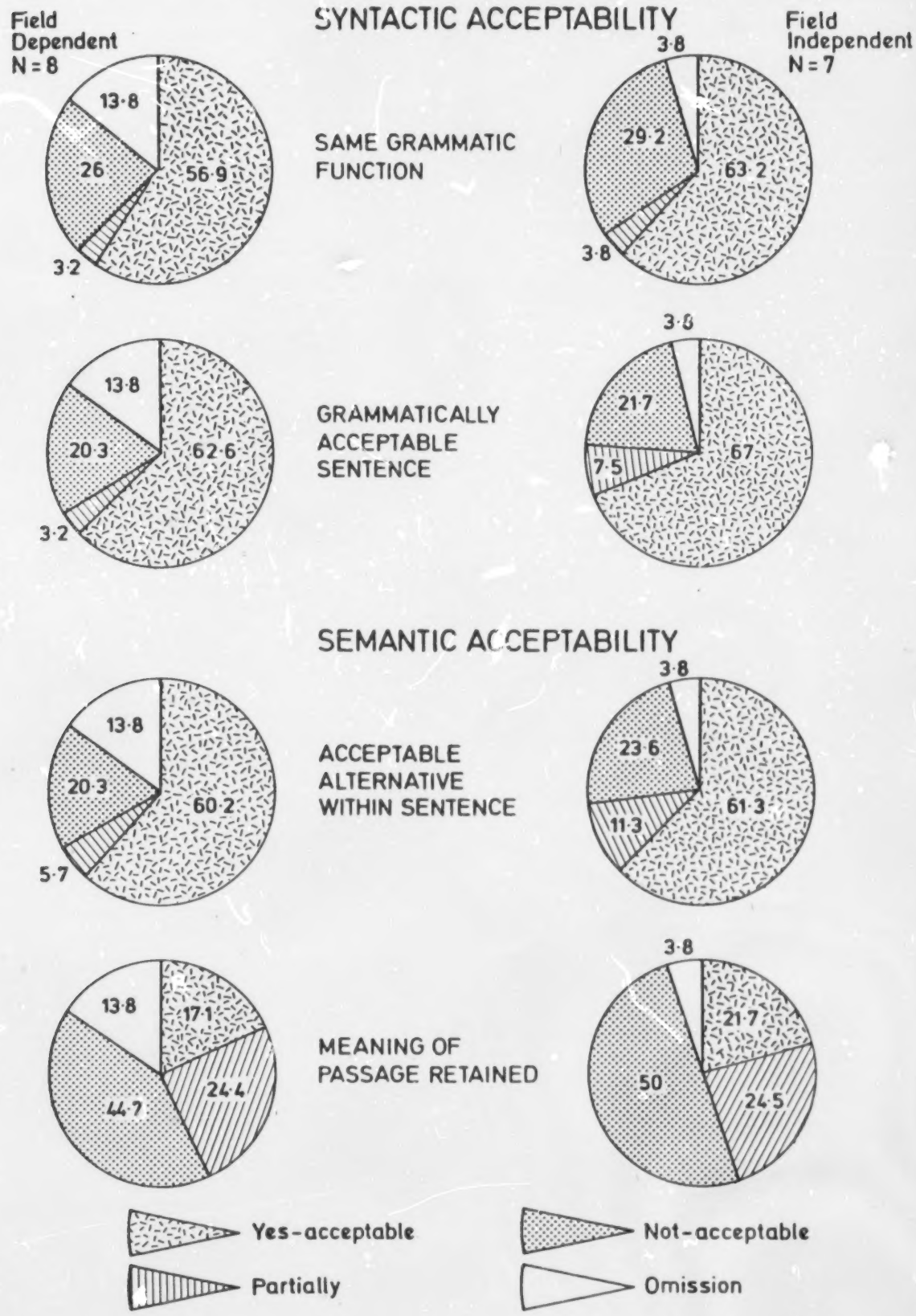
ANALYSIS OF ERRORS – INSTRUCTIONAL LEVEL
Field Dependent N = 8
Field Independent N = 7
SYNTACTIC ACCEPTABILITY
SAME GRAMMATIC FUNCTION
13·8
26
56·9
3·2
3·8
29·2
63·2
3·8
GRAMMATICALLY ACCEPTABLE SENTENCE
13·8
20·3
62·6
3·2
3·8
21·7
7·5
67
SEMANTIC ACCEPTABILITY
ACCEPTABLE ALTERNATIVE WITHIN SENTENCE
13·8
20·3
60·2
5·7
3·8
23·6
11·3
61·3
MEANING OF PASSAGE RETAINED
13·8
17·1
24·4
44·7
3·8
21·7
50
24·5
Yes-acceptable
Not-acceptable
Partially
Omission

Figure IIIb

ANALYSIS OF ERRORS – INDEPENDENT LEVEL

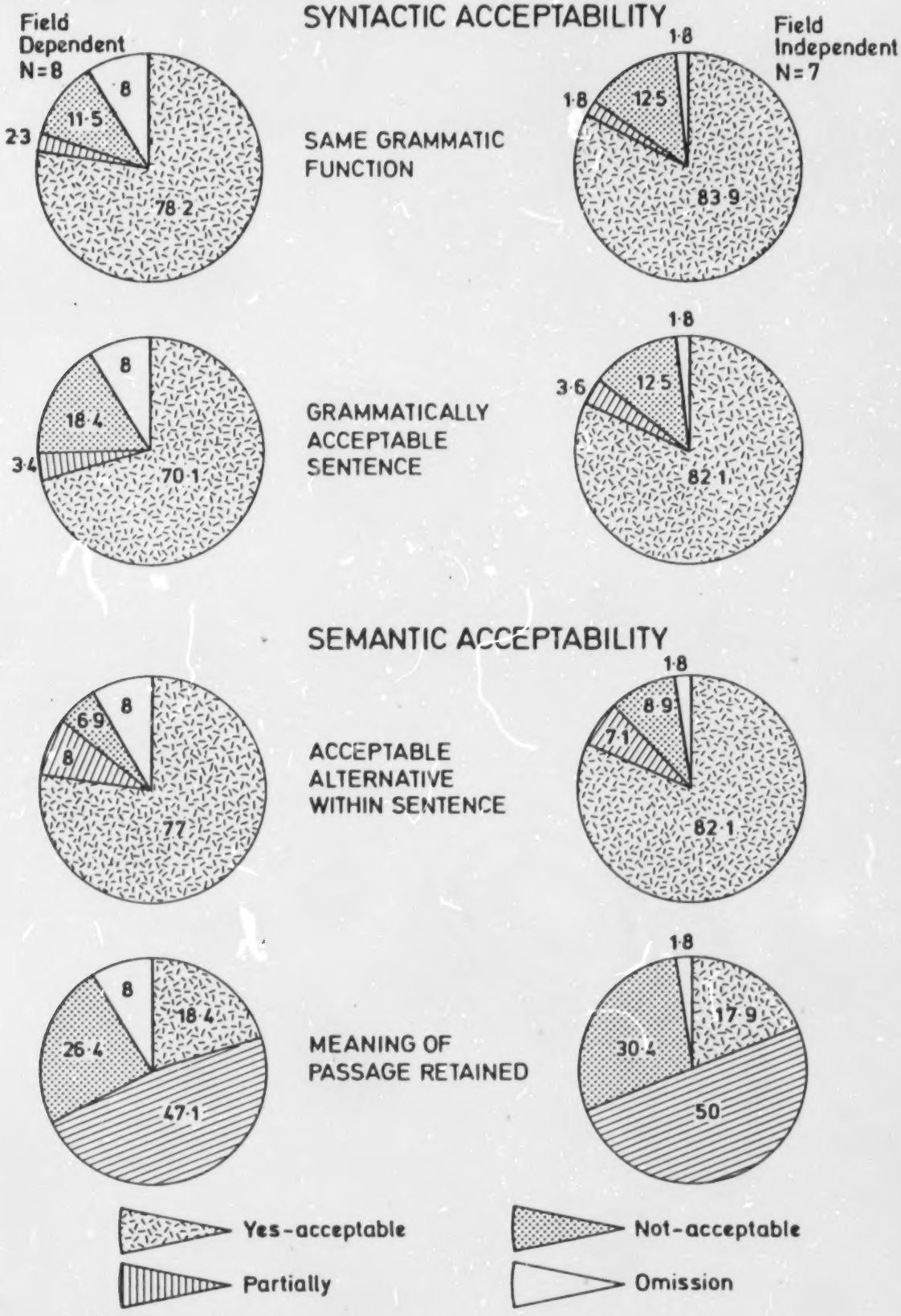

Figure IIIc

An analysis of error patterns for the three difficulty levels for both cognitive styles indicates:

1. An increase in syntactic acceptability as difficulty level decreases.

2. An increase in semantic acceptability at the sentence level as difficulty level decreases and a substantial increase of partial retention of passage meaning as the difficulty level decreases.

3. Error patterns are most similar at the independent level and least similar at the frustration level.

Since the subjects were poor readers it was considered likely that the content texts the school would require them to read would be at a frustration level, therefore an analysis of error patterns at that level will be discussed in this paper.

1. For FD subjects, with the exception of the Meaning of Passage Retained category, omissions and acceptable alternatives each accounted for more than one-third of the errors. For the Meaning of Passage Retained category omissions and unacceptable alternatives each accounted for more than one-third of the errors.

2. For FI subjects, with the exception of the Meaning of Passage Retained category, there was a very low percentage of omissions (4%) and acceptable alternatives accounted for approximately two-thirds of the total errors. For the meaning of Passage Retained category, more than half of the errors were unacceptable alternatives.

CONCLUSIONS

1. There are noticeable differences between FD and FI students at the Frustration and to a lesser degree at the Instructional level. Therefore, it would seem to be important that the Cogntive Style of all students, but particularly poor readers, be known since different instructional methods to be discussed later in this paper will be required.

2. At the Independent level there are similar patterns of accuracy and of error types for both FD and FI students suggesting that good readers, irrespective of cognitive style process print in similar ways. This would support the Goodman hypothesis discussed earlier that efficient readers select from among all available cues only those that confirm their predictions about the meaning encoded in the printed message.

3. For both FD and FI subjects with the exception of the Meaning of Passage Retained category, the high occurrence of acceptable alternatives at all difficulty levels seems to indicate that students are efficient users of their language, but use the sentence as the contextual unit for "guessing" unknown words.

4. For both FD and FI subjects on the Meaning of Passage Retained category, there is a "dramatic" increase in partially retained meaning from the Frustration to the Independent level. This would seem to indicate that there

is a big increase in the acquisition of the author's "message" at the Independent level. The implication of this for content reading will be discussed later in the paper.

RECOMMENDATIONS

At the three difficulty levels of reading, the miscues of FD and FI students give evidence of the students' facility with the grammar of their language. However, it was only at the independent level that the miscues of both groups indicated a partial understanding of the author's meaning. If one accepts Smith's (1978) proposition that it is the meaning or "theory" that the reader brings to the reading that determines the meaning he gets, it would seem essential that all subject teachers ensure that their students have competence with and understanding of the technical vocabulary, concepts and writing style before they are required to read set texts.

In Queensland, children are not exposed to set texts until secondary school, so it is important for subject teachers to show them how to use text books and resource materials. Students need to be taught location and reference skills and the study skills of skimming, scanning, outlining and summarising. These skills would help FD students who need structure for learning, and FI students who want to set their own pace.

It is also important to "match" the student to the text, and not the converse. In most classes there will be a wide range of reading achievement, and teachers need to provide texts at varying levels of reading difficulty which cover the subject matter. However, it is not always easy or desirable to reduce difficult vocabulary or complex concepts to simple terms. Therefore, Herber's (1978) suggestions for showing students *HOW* to learn seem appropriate. Herber (p.174) has applied Ausubel's (1968) concept of "advance organisers" to content reading. Herber's pre-reading procedures, called "structured overviews", help students to 'perceive the relationships which exist among the words representing the ideas which form the concept'. In this way new vocabulary and new concepts are taught and old vocabulary and old concepts are clarified. These structured overviews provide a framework for the new content material needed by FD students. Similar activities after reading the text materials, called "graphic organisers" require students to clarify their understanding of the passage by using key vocabulary words to outline the relationship of the concepts, as they perceived them - an activity that will require students to review and refine.

Matching and maze cloze exercises, where students are given several alternatives for deleted words, are useful techniques for teaching new vocabulary and

concepts. These modifications of the cloze technique offer structured reading with limited alternatives for guessing and with improved chances of successful prediction.

Students often need help to understand the purpose of content reading. Pre-posed true-false statements will cue the reader for expected outcomes. Inter-posed and post-posed true-false statements will force students to review and refine predictions so that the desired learning outcomes are achieved. Herber (1978) suggests that simple declarative statements are more effective than questions, since the true statement will show the student *HOW* to answer comprehension questions.

While it is important to be aware of the cognitive style of each student, and its implications for learning, it is not recommended that students should be labelled. Labelling often infers defect or disability. Cognitive style indicates a difference in ways of learning, an individual difference. Therefore, it is recommended that these procedures be carried out with heterogeneous groups (e.g. cognitive style, ability and achievement) since the interaction between peer-group members of different abilities will provide a facilitating learning environment for all.

IMPLICATIONS FOR FURTHER RESEARCH

This was a pilot study to see if there were differences in patterns of accuracy and of errors at different difficulty levels of discursive prose between FD and FI poor readers.

The study indicates a need for further research into accuracy and error patterns on different types of content reading, of a representative sample of FD/FI students.

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